Statistical Analysis in the second study for students with effective participation

Table 1: Two-way ANOVA and Scheirer-Ray-Hare in the second study for students with effective participation

	Sum Sq	Df	F value	Pr(>F)	Sig	Df	Sum Sq	H	p.value	Sig
difScore.(Intercept)	65.500	1	21.839	0.000						
difScore.Type	2.788	1	0.930	0.341		1	1.970	0.012	0.911	
difScore.CLRole	25.915	1	8.641	0.006	**	1	1252.252	7.943	0.005	**
difScore.Type:CLRole	0.850	1	0.283	0.598		1	27.508	0.174	0.676	
difScore.Residuals	116.969	39				39	5339.769			

Signif. codes: 0 “**” 0.01 “*” 0.05

Table 2: Summary of Pair wilcoxon in the second study for students with effective participation

	Group	N	Median	Mean.Ranks	Sum.Ranks	U	Z	p.value	r	magnitude
difScore.Type:CLRole.greater.1	non-gamified.Apprentice	18	2.09	15.33	276.0	105.0	1.83	0.035	0.360	medium
difScore.Type:CLRole.greater.2	non-gamified.Master	8	0.96	9.38	75.0	105.0	1.83	0.035	0.360	medium
difScore.Type:CLRole.greater.11	non-gamified.Apprentice	18	2.09	13.42	241.5	70.5	1.90	0.029	0.396	medium
difScore.Type:CLRole.greater.21	ont-gamified.Master	5	−0.21	6.90	34.5	70.5	1.90	0.029	0.396	medium
difScore.Type:CLRole.less.1	non-gamified.Master	8	0.96	7.00	56.0	20.0	−2.16	0.016	0.483	medium
difScore.Type:CLRole.less.2	ont-gamified.Apprentice	12	2.55	12.83	154.0	20.0	−2.16	0.016	0.483	medium
difScore.Type:CLRole.two.sided.1	non-gamified.Master	8	0.96	7.00	56.0	20.0	−2.16	0.031	0.483	medium
difScore.Type:CLRole.two.sided.2	ont-gamified.Apprentice	12	2.55	12.83	154.0	20.0	−2.16	0.031	0.483	medium
difScore.Type:CLRole.greater.12	ont-gamified.Apprentice	12	2.55	10.67	128.0	50.0	2.11	0.018	0.511	large
difScore.Type:CLRole.greater.22	ont-gamified.Master	5	−0.21	5.00	25.0	50.0	2.11	0.018	0.511	large
difScore.Type:CLRole.two.sided.11	ont-gamified.Apprentice	12	2.55	10.67	128.0	50.0	2.11	0.037	0.511	large
difScore.Type:CLRole.two.sided.21	ont-gamified.Master	5	−0.21	5.00	25.0	50.0	2.11	0.037	0.511	large

1 Assumptions for Parametric Tests

Table 3: Univariate normality test in the second study for students with effective participation

	normality.fail	W	p.value
difScore	FALSE	0.987	0.89

Table 4: Notes to be taken into account about sample size in the second study for students with effective participation

	code	description
difScore.Type.1	WARN: sample.size	current size is 12 and recommended size is 15 for the group: 'ont-gamified:Apprentice'.
difScore.Type.2	WARN: sample.size	current size is 8 and recommended size is 15 for the group: 'non-gamified:Master'.
difScore.Type.3	WARN: sample.size	current size is 5 and recommended size is 15 for the group: 'ont-gamified:Master'.

Recent studies carried out through simulations have indicated that ANOVA is reliable even when the data are non-normally distributed and the sample size is greater thatn 15 observations for each group. This size value is based on the Reference: Rana, R. K., Singhal, R., & Dua, P. (2016). Deciphering the dilemma of parametric and nonparametric tests. Journal of the Practice of Cardiovascular Sciences, 2(2), 95.

The sample size to carried out any parametric and non-parametric analysis is 5, and it was established using common sense. The warning and fails indicated in this section should be taking into account when a paper or report will be elaborated.